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ABSTRACT

This booklet explains some of the day care safety features specified by the new Massachusetts State Building Code (January 1, 1975) which must be met before a new day care center can be licensed. The safety features described are those which most often require renovation to meet the building code standards. Best estimates of the costs involved in such renovations have also been detailed and included. The renovations described include: (1) fire doors, (2) boiler rooms (especially walls, ceilings, and fire doors), (3) emergency lighting, (4) double handrails, (5) fire extinguishers, (6) radiator guards, (7) stairway enclosures, (8) fire alarms, (9) vents and (10) access for the handicapped. (JMB)

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COMMON DAY CARE SAFETY RENOVATIONS:

DESCRIPTIONS, EXPLANATIONS AND COST ESTIMATES

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May, 1975

Common Day Care Renovations

Compliance with the new Massachusetts State Building Code (January 1, 1975) has been vastly complicated for day care operators by the problem of understanding the variety of safety standards now involved. Since costly renovations often have to be made in order to satisfy safety standards, it is essential that the pertinent regulations be clearly understood. Acoordingly, this booklet seeks to explain those day care safety features that the new code specifies for which renovations are usually necessary. In addition, best estimates of the costs involved in such renovations have been detailed and included.

It is important to note that the information here included is directed toward prospective day care licensees only. Centers licensed before January 1, 1975 will be permitted to continue operating legally unless the local building official decides that conditions exist which are "hazardous to the general safety and welfare of the occupants and the public." (Section 105.1)*

Certain variables may be expected to affect the above named estimates. In some cases figures were based on subjective conceptions of "average" situations. Complications or extenuating circumstances were considered, but calculating and accounting for all gradations of difficulty would have been impossible. Furthermore, an increase in the volume of work generally decreases the per unit costs. Also, contrasts in wage scales (union vs. non-union labor) affect prices considerably, since labor costs determine a high proportion of the total expense involved. Our figures are all based upon union wage scales. In addition, a spiralling inflation alters vastly our December 1974 price estimates which are presently subject to an approximate 12 to 20% annual increase. Nevertheless, provided the variables are considered, these prices should serve as reasonable bases from which to derive workable individual estimates.

The cost information contained here was obtained from two sources. Day care centers which began within the past year were sampled in order to discover the most common safety renovations and their costs. Then estimates for each safety renovation were elicited from contractors. They were also questioned about safety features that have been added to the new code.

This booklet does not concern itself with other aspects of licensing, such as lead paint standards, toilet regulations and outside fencing. It is concerned solely with information that will assist day care licensees in successfully obtaining an occupancy permit from their local building official.

*All section references refer to clauses of the Massachusetts State Building Code.

1. Fire Doors

A. Safety Standards

Fire doors* are mandatory for many types of building uses including day care centers. If your center is going to occupy area in space below grade, fire door installations will be necessary; day care centers are prohibited in the cellars of buildings with 4b (wood frame unprotected) construction.** Sections 427.21 and 427.22 require two independent stairways from basements and cellars, one which must lead to grade. Furthermore, "required stairways shall be of at least one (1) hour fireresistive construction" (Section 427.21). Fireresitant doors must be provided at the top and bottom of stairways leading either to the first floor or grade.

Fire doors are, also, necessary for the enclosure of boiler rooms in day care centers. However, for the sake of clarity we will discuss this use subsequently when safety standards for boiler rooms are explained.

B. Costs

In most cases, B-label solid core wood fire doors will be sufficient for day care centers located in churches and residential dwellings. The cost for installations of a self-closing fire door is approximately $225 - $275.

C. Possible Additional Costs

Usually the original frame can be used for a fire door. Exceptions are boiler room fire doors in which an entire new door and frame must be installed, or situations where a new door frame will have to be utilized because the existing one doesn't comply with the doorway width standards of Section 427.3:

> All exitway doorways shall be at least thirty-six (36) inches in width. All other doorways shall be at least thirty-two (32) inches in width.

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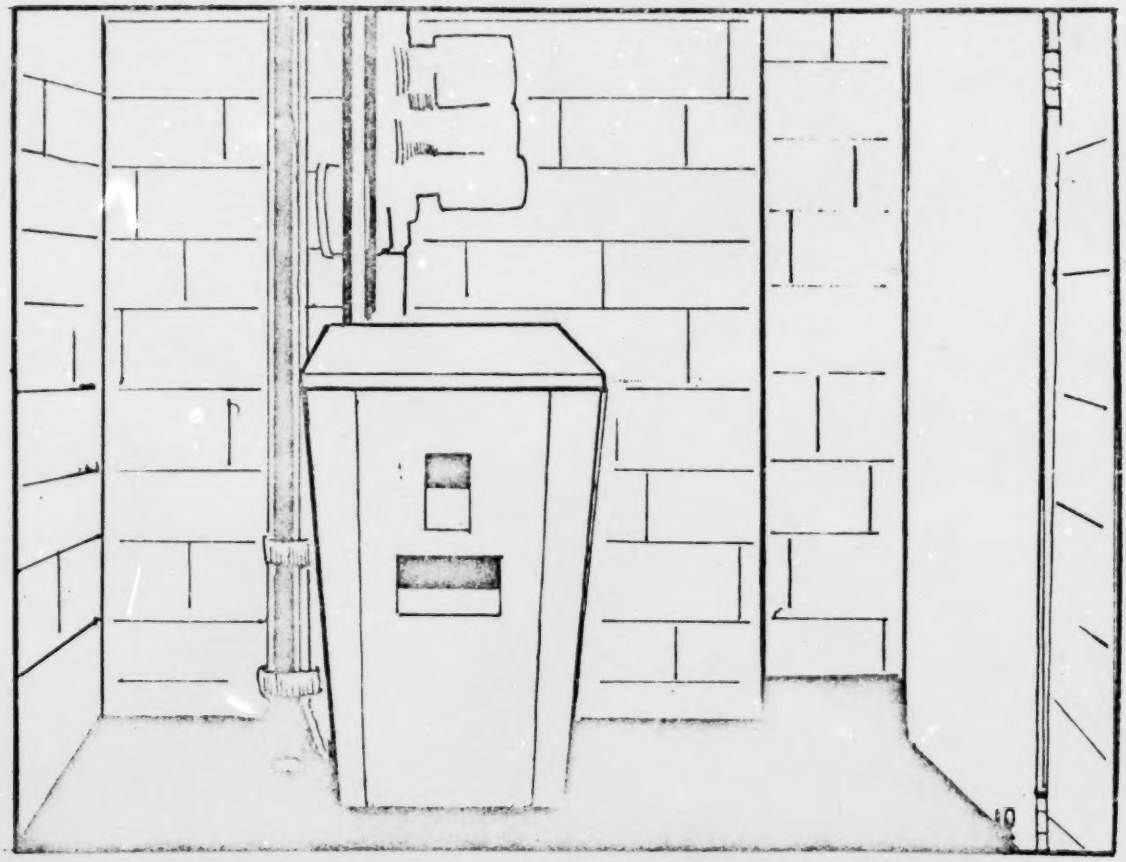
*Please refer to the glossary for building safety term definitions.

** Section 427.21 allowing limited cellar usage is an amendment to the code; according to the original code day care centers in basements of 4b construction buildings and cellars in all structures are disallowed. The amendment has been passed by the Office for Code Development and was discussed at a public hearing March 7, 1974. It should, hopefully, become law sometime in the spring of 1975.

Also, if a door has to be installed where one didn't previously exist, a portion of a wall will have to be demolished to allow for the new door.



11. Boiler Rooms

As specified in Section 427.6, all heating units (boilers, furnaces, etc.) have to be completely enclosed as required in Section 1113 which maintains that:

> ...all heating boilers installed in a building or structure shall be located in a separate room or compartment completely enclosed by floor, walls, and ceilings of the required fireresistance; but in no case shall the enclosure of boiler rooms have less than two (2) hour fireresistance for high pressure boilers and not less than three-

quarter (3/4) for low pressure boilers.

Therefore, if you own a boiler which is not enclosed, you will have to provide for three basic renovations: a wall enclosure, a fireresistant ceiling, and a door installed in the wall as an egress from the boiler. Usually, floors are sufficiently fireresistant so that additional protection is not necessary.

A. BOILER ROOM WALLS

1. Safety Standards

The previous state day care building code included the regulation that wall enclosures of boiler rooms must be two-hour fireresistant. The cheapest and most common method of complying with this clause was to construct a wall composed of 8" wide concrete blocks.

The new state building code isn't as precise as its predecessor. Instead of specifying an exact measure of fireresistance for heating enclosures, Section 1113.1 (cited above) provides that the required fireresistance must be "not less" than either two (2) hours or three-quarters of an hour depending upon the pressure of the boiler. For our purposes, we should concern ourselves with the three-quarter-hour figure since a preponderance of day care centers needing enclosures have low pressure boilers. Therefore, the required wall enclosure could be constructed with as little as three-quarter-hour fireresistance. However, the building inspector can legally demand a higher fire rating.

Since concrete block boiler enclosures have been so prevalent until now, we assume that they will continue to be used extensively in the future. Therefore, the safest course of action would be to construct a wall of concrete blocks. You might wish to consult with your local building officials to consider other possible alternatives.

2. Costs

To obtain a meaningful cost estimate, we used our perception of the dimensions of a typical one-family house boiler room enclosure, since such dwellings are the ones usually needing this construction. Generally, as we have noted, per unit costs decrease with volume so that some median model was needed. So our figures are based upon a boiler enclosure that is eight (8) feet high and ten (10) feet long with area subtracted for installation of a fire door. Moreover, we considered expenditures based upon only two walls since many boilers are located in basement corners so that two of the foundation walls

will, generally, be accepted as being suitable enclosures.

The cost for such an undertaking averages between $3.00 - $3.50 per square foot. This would amount to $425 - $500 for the two walls.

B. BOILER ROOM CEILINGS

1. Safety Standards

Similar to the walls in boiler rooms, the ceiling has to be at least three-quarter hour fireresistant. The prevalent method of complying with ceiling fireresistance standards is by installing "5/8" fire code sheet rock.

It is important to note, however, that some buildings are initially constructed with floors and ceilings that are three-quarter hour fireresistant. Many houses and churches don't meet this degree of protection, but most of the larger, better constructed buildings do. For many day care centers, therefore, it will be necessary to have sheet rock installed, but in some it may not.

2. Costs

Employing the same boiler room dimensions as were used for the wall enclosure, estimated costs for installing "5/8" fire code sheet rock on a ceiling were determined.

Typically, costs averaged $2.00 - $2.50 per square foot or about $200 - $225 for a 100 square foot ceiling.

3. Possible Additional Costs

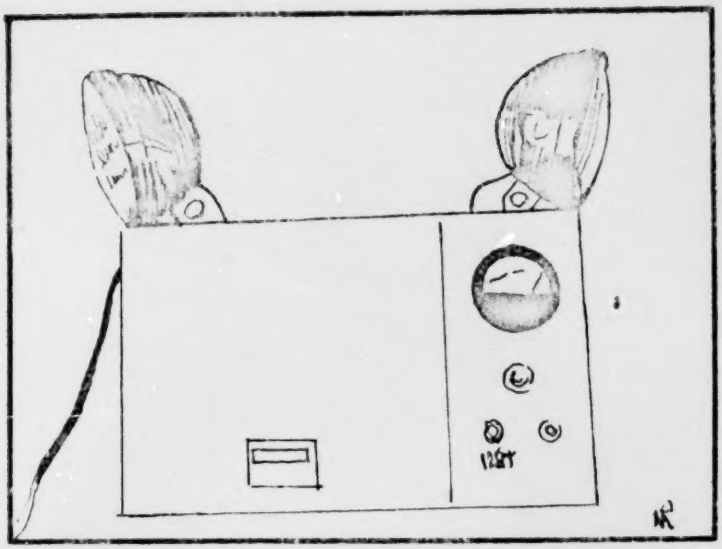
Expenditures for ceiling construction may be expected to vary further according to the extent and arrangement of pipes in the heating area.

C. BOILER ROOM FIRE DOORS

1. Safety Standards

At least three-quarter hour fire doors are necessary for the enclosure of boiler rooms in day care centers. Previously, 1½ hour metal fire doors were required. We suspect that many local building

officials, from prior habit, will continue to specify the somewhat more expensive metal doors.



III. Emergency Lighting

A. Safety Standards

All means of egress must be equipped with emergency lighting (Section 624.4). Generally, lights are placed in corridors and over doorways, in order to insure that all such egresses can be clearly illuminated whenever the building is inhabited.

Moreover, all exitways (stairways, corridors, etc.) must have illuminated "EXIT" signs, which are connected to the emergency lighting system, "to indicate at any point in the required exitway the approved direction of egress discharge" (Section 623.1).

B. Costs

The price for installation of an emergency light battery unit sufficient for day care, will normally average from about $200 - $275. If necessary, remote lights or heads may be wired to the central panel and used to illuminate other areas. The cost of the remote locations installations depends largely on the extent of the wiring that has to

be undertaken. Usually, the closer the remote light is to the central station, the simpler the wiring is and the cheaper the cost. Under normal conditions, the extra cost for the installation of the first remote light should be about $60 - $100 with similar or cheaper costs for each successive station (applying similar wiring expenses).

Finally, the cost for connecting the emergency lighting system to an exit sign should be about $75 - $125.

C. Possible Additional Costs

Extensive wiring or wiring complications will naturally increase the expense of any installation.

IV. Double Handrails

A. Safety Standards

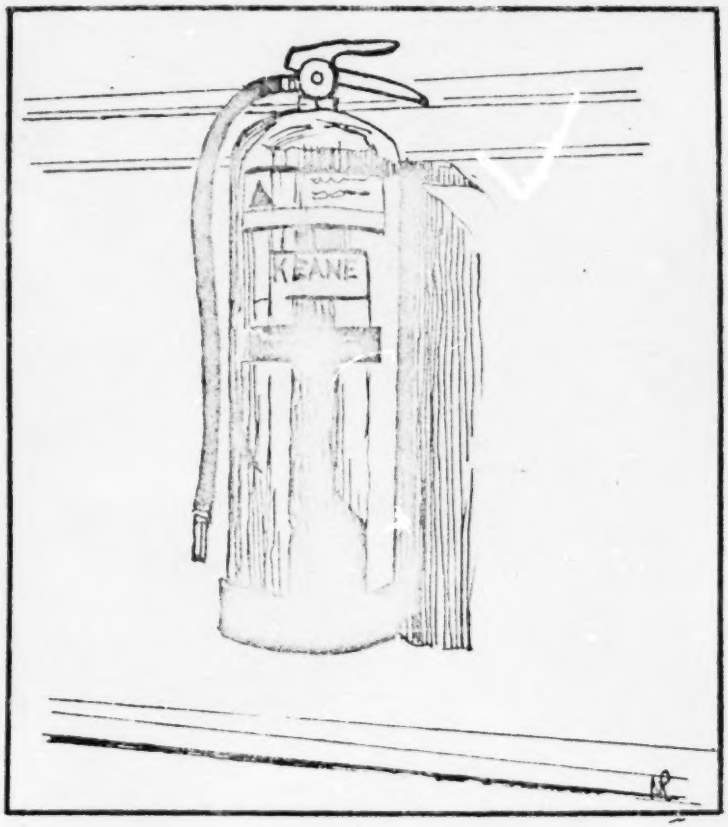
Many of the younger children in day care centers aren't able to reach the handrails found in most buildings. Therefore, in order to make stairs safer for these youngsters, there is a clause in the state building code that states:

> 427.4 All required egress stairways shall be provided with double handrails on both sides, and these shall be continuous including all runs and platforms and shall be built as follows:
> a) the upper rail shall be not less than thirty (30) inches nor more than thirty-three (33) inches, measured vertically, above the nosing of the threads.
> b) the lower rail shall be installed at approximately twenty (20) inches high measured vertically at the face of the riser.

B. Costs

Using either wood or aluminum, costs for installing a handrail for one stairway on an existing wall average about $5.00 - $7.00 per linear foot. The expense will be doubled, at least, if there is no wall on which to affix the railings.

V. Fire Extinguishers



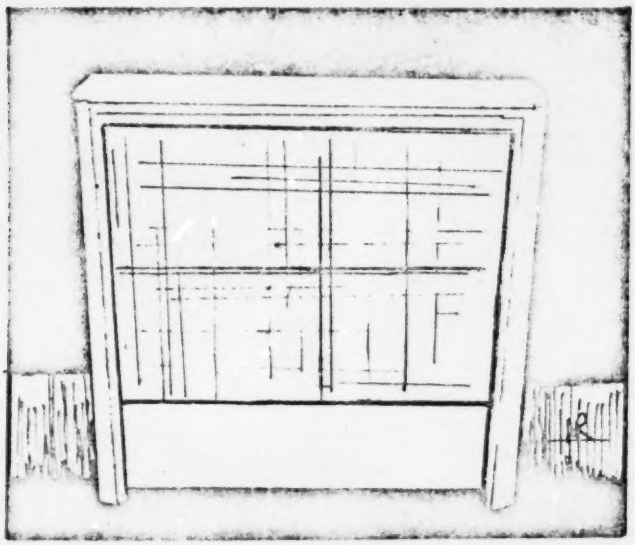
A. Safety Standards

The placement of fire extinguishers is under the jurisdiction of the local fire official (Section 1217.0). Usually, in the more dangerous areas such as kitchens, operators are ordered to place extinguishers in places of easy access. Corridors and hallways are other frequent locations of such equipment.

B. Costs

There are different sizes and types of fire extinguishers. Prices quoted were obtained from retailers and refer to the 2½ gallon pressurized water and the ABC 10 lbs, all purpose powder. The costs for each usually range from $30 - $40.

VI. Radiator Guards



A. Safety Standards

Section 427.5 of the state building code states that:

> Any heaters in spaces occupied by children shall be separated from the occupied space by partitions, guards, screens, or other means.

A guard constructed of wood or metal encompassing the heater is the standard means of protecting children from harmful contact with a hot radiator.

B. Costs

Since there are various size radiators, there are also various size radiator covers. Generally, though, the expenditure incurred will be between $35 and $55.

VII. Stairway Enclosures

A. Safety Standards

All stairways leading from basements and cellars in day care facilities must be completely enclosed with one hour fireresistant construction (Section 427.21 and 427.22). Therefore every required stairway has to be completely surrounded by fireresistant walls and ceilings with self-closing fire doors so that an individual attempting to escape from a lower story will be protected for approximately one hour from the hazard of fire.

In many buildings, especially wood frame structures, the walls and ceilings are not sufficiently fireresistant. Therefore, in order to comply with the state standards, "5/8" sheet rock is usually installed over existing walls and ceilings. Finally, the required fire doors are placed at the top and bottom of the staircase.

B. Costs

The cost for enclosing one stairway with "5/8" fire code sheet rock in a building that has 7'6" to 8' ceilings should average from $550 - $750, assuming pre-existing walls. Of course, if the ceilings are higher, the costs will be increased. If fire doors have to be installed at the top and bottom of the staircase an additional amount of approximately $450 - $550 will have to be estimated.

C. Possible Additional Costs

Some stairways are not completely enclosed with walls. In such cases, enough wall area to enclose the stairway has to be built. Such an undertaking will be more expensive than merely adding "5/8" fire code sheet rock to an existing wall.

VIII. Fire Alarms

A. Safety Standards

The regulations pertaining to fire alarm systems in day care centers are somewhat vague and complex. Section 1218.213 reads:

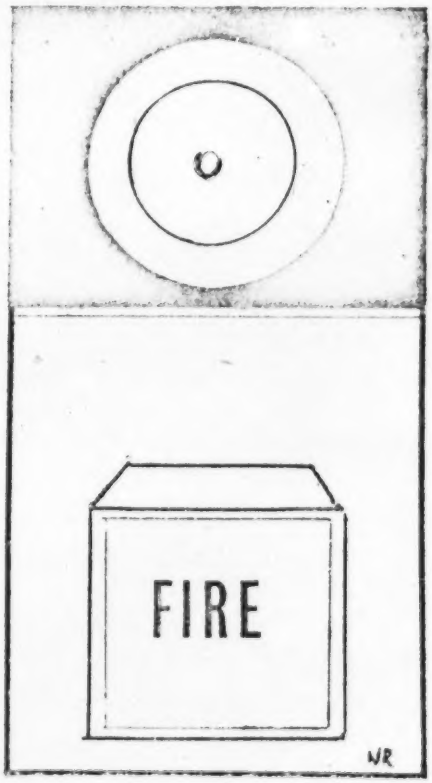
> a) Facilities for up to twenty-four (24) or more children shall be provided with a local alarm system.
>
> b) Facilities for twenty-five or more children shall be provided with an approved electrical fire alarm system consisting of approved smoke or smoke and heat detectors located in all occupied rooms and as required by the building official. The alarms shall be distinctive and audible everywhere on the floor. There also shall be at least one (1) manual alarm on each floor which shall sound all alarms on other floors simultaneously and continuously when operated. An approved secondary or emergency source of power shall be provided for the entire alarm system.

A local alarm system as mentioned in section (a) is one in which an alarm is sounded solely on the premises where the fire is detected. In contrast, a central alarm system is one in which the system is connected to some outside protective agency such as a fire station so that

personnel both there and on the premises are simultaneously alerted to the fire's existence.

Section (a) does not specify what type of local alarm system is necessary. Inexpensive manual alarms or bells are considered to be local alarms, but so are smoke and heat detectors that can be sounded simultaneously. The decision as to the complexity of the system is under the jurisdiction of the local building official. Previously, many small centers were considered adequately protected if manual stations or bells were installed. However, the current trend seems to be towards the more expensive and safer smoke and heat detectors. Usually, the area protected is so limited that an alarm can be heard throughout the center making it unnecessary to install a device insuring simultaneous ringing of all alarms. Section (b) referable to facilities housing 25 or more children also describes a local alarm system. However, in such cases the more expensive electrical type with a station capable of transmitting simultaneous warnings is specified as being mandatory.

In addition, smoke detectors, which are approximately five times more expensive than heat detectors, must be installed. Furthermore there has to be an emergency power source for the system.



B. Costs

As mentioned, there can be a wide range of systems that fulfill the requirements of the code for centers with twenty-four or less children and each system has varying degrees of complexity. As a result, an accurate cost estimate for smaller centers would be almost impossible.

You probably noticed that section (b) states smoke or smoke and heat detectors are to be placed in " all occupied rooms and as required by the building official" (Section 1218.213). Because of this latitude allowed to the judgment of the building official, it's virtually impossible to formulate an accurate estimate of the costs that may be involved in the installation of a fire detection system of a center with 25 or more children. Some building officials require detectors in day care activity rooms while others necessitate them in all rooms, closets, etc. throughout the building. Moreover, large size rooms may require more than one detector to provide adequate protection.

However, from the centers sampled it is possible to indicate costs generally. Customarily, in the smaller centers under section (a) in buildings used basically or totally for day care, the costs ranged from a couple of hundred dollars to about $1000. For large centers the costs ranged from a low of a few hundred dollars to a high of $7000.

There is one general rule that may be followed: the more rooms and floors the center occupies, the more expensive the fire alarm will be.

IX. Vents

A. Safety Standards

Every heating room has to have sufficient ventilation (Section 1113.5). Therefore, a venting system to provide fresh outside air should be constructed. A means of air escape from the heating room is also necessary: in many cases an opening in the boiler room enclosure wall will be sufficient.

B. Costs

Similar to fire detection system, the costs for ventilation are very difficult to estimate. The distance from the heater to the outside air, the size of the vents needed, the accessibility of a location to install the necessary vents, and the extent of obstructions would have

to be known.

However, it is usually safe to assume that ventilations should not be a major expense.

x. Access for the Handicapped

Section 603.4 specifies that there must be at least one primary entrance in day care centers that is usable and accessible to the handicapped. There are various ways of satisfying this requirement, depending upon the situation and the desires of the building inspector. Consequently, it would be impossible to estimate the costs that would be involved to satisfy this standard.

Glossary

BASEMENT (Section 201.0) - "a portion of the building partially underground, but having less than half its clear height below the grade plane."

CELLAR (Section 201.0) - "the portion of the building partially underground, having half or more than half of its clear height below the grade plane."

EMERGENCY LIGHTING (Section 624.4) - "an independent power source which can sustain light at a strength of a three (3) foot candle measured at floor level. The power source must be able to operate for at least one and a half (1½) hours independently of the failure of any other circuit or source of power."

EXITWAY (Section 601.0) - "that portion of a means of egress which is separated from all other spaces of a building or structure by construction or equipment as required in this Code to provide a protected, unobstructed way of travel to the exitway discharge."

EXITWAY ACCESS (Section 601.0) - "that portion of a means of egress which leads to an entrance to an exitway."

EXITWAY DISCHARGE (Section 601.0) - "that portion of a means of egress between termination of an exitway and a public space with access to a public way or street."

FIRE DOOR (Section 901.0) - "a door and its assembly, so constructed and assembled in place as to give protection against the passage of fire."

FIRERESISTANCE (Section 901.0) - "that property of materials or their assemblies which prevents or retards the passage of excessive heat, hot gases or flames under conditions of use."

FIRERESISTANCE RATING (Section 901.0) - "the time in hours or fractions thereof that materials or their assemblies will resist fire exposure as determined by fire tests conducted in compliance with recognized standards."

GRADE (Section 201.0) - "a reference plane representing the average of finished ground level adjoining the building at all exterior walls."

HIGH PRESSURE BOILER (Section 1101.0) - "a boiler in which steam or other vapor to be used externally to itself, is generated at a pressure of more than fifteen (15) pounds per square inch guage."

LOCAL SYSTEM (NFPA 72A-Chapter 1, Article 100) - "a local system is one which produces a signal at the premises protected."

LOCAL ALARM SYSTEM (NFPA-Chapter 1, Article 100) - "a local system sounding an alarm as the result of the manual operation of a fire alarm box or of the operation of protection equipment or systems, such as water flowing in a sprinkler system, the discharge of carbon dioxide, the detection of smoke or the detection of heat."

LOW PRESSURE BOILER (Section 1101.01) - "a steel or cast iron boiler in which the maximum allowable guage working pressure is limited to fifteen (15) pounds per square inch for steam and thirty (30) pounds per square inch for hot water."

MEANS OF EGRESS (Section 601.0) - "a continuous and unobstructed path of travel from any point in a building or structure to a public space and consists of three (3) separate and distinct parts: (a) the exitway access, (b) the exitway, and (c) the exitway discharge; a means of egress comprises the vertical and horizontal means of travel and shall include intervening room spaces, doors, hallways, corridors, passageways, balconies, ramps, stairs, enclosures, lobbies, escalators, horizontal exits, courts and yards."

SELF-CLOSING (Section 601.0) - "as applied to a fire door or other protective, means normally closed and equipped with an approved device which will insure closing after having been opened for use."

VENTILATION (Section 1801.0) - "the process of supplying or removing air by natural or mechanical means to or from any space. Such air may not have been conditioned."